

**IN THE UNITED STATES
PATENT AND TRADEMARK OFFICE**

Patent Application

Inventor(s): ANDREW ROMAN CHRAPLYVY et al.
Case: Chraplyvy 28-16-5-3-1-7 (ALU/124225)
Serial No.: 09/990,964 **Group Art Unit:** 2613
Filed: 11/21/2001 **Confirmation #:** 3319
Examiner: Li, Shi K.
Title: LONG HAUL TRANSMISSION IN A DISPERSION MANAGED
OPTICAL COMMUNICATION SYSTEM

**MAIL STOP APPEAL BRIEF-PATENTS
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450**

SIR:

REPLY BRIEF

Appellants submit this Reply Brief to the Board of Patent Appeals and Interferences in response to the Examiner's Answer, dated August 7, 2009, in the Appeal of the above-identified application.

In the event that an extension of time is required for this Reply Brief to be considered timely, and a petition therefor does not otherwise accompany this Reply Brief, any necessary extension of time is hereby petitioned for.

The Commissioner is authorized to charge any fees due, including extension of time and excess claim fees, to counsel's Deposit Account No. 50-4802/ALU/124225.

REMARKS

Section 10 (Response to Arguments)

In Section 10 (Response to Arguments) of the Examiner's Answer, the Examiner provides answers to the arguments made by the Appellants in the Appeal Brief filed for the above-identified application. The rejection of claims 1, 10-13, 15-16, 21, 24-25 and 28 is maintained under 35 U.S.C. 103(a) as being unpatentable over Atia, et al. ("Demonstration of Return-to-Zero Signaling in Both OOK and DPSK Formats to Improve Receiver Sensitivity in an Optically Preamplified Receiver", IEEE Lasers and Electro-Optics Society, 12th Annual Meeting, 8-11 Nov. 1999, hereinafter "Atia") in view of Clausen, et al. (U.S. Patent No. 6,832,050 B1, hereinafter "Clausen") and Fukuchi (U.S. Patent 5,745,613, hereinafter "Fukuchi"). The rejection of claims 22-23 and 26-27 is maintained under 35 U.S.C. 103(a) as being unpatentable over Atia, Clausen and Fukuchi as applied to claims 1, 10-13, 15-16, 21, 24-25 and 28 and further in view of Doran et al. (U.S. Patent No. 7,352,970 B2, hereinafter "Doran"). The Examiner's answers to Appellants' arguments are addressed below.

POINT I – The Examiner's Answer Still Fails to Give Proper Consideration to the "Secondary Evidence" Presented by Appellants under the *Graham* Factors

In the Appeal Brief, Appellants set forth seven points addressing various indicia of non-obviousness and supporting the patentability of the pending claims under 35 U.S.C. §103(a) in view of the cited references. In particular, the Appellants respectfully alleged that "the evidence of non-obviousness vastly outweighs any evidence suggesting to the contrary." (See Appeal Brief p. 15).

In response, the Examiner's Answer asserts that "there is no such thing as 'evidence of non-obviousness' in 35 U.S.C. 103(a)..." (See Examiner's Answer p. 8). Appellants respectfully disagree and refer the Board to MPEP § 716.01(a) which is titled "Objective Evidence of Nonobviousness" and which states in part:

Affidavits or declarations, when timely presented, containing evidence of criticality or unexpected results, commercial success, long-felt but unsolved needs, failure of others, skepticism of experts, etc., must be considered by the examiner in determining the issue of obviousness of claims for patentability under 35 U.S.C. 103... Examiners must consider comparative data in the specification which is intended to illustrate the claimed invention in reaching a conclusion with regard to the obviousness of the claims. *In re Margolis*, 785 F.2d 1029, 228 USPQ 940 (Fed. Cir. 1986). The lack of objective evidence of nonobviousness does not weigh in favor of obviousness. *Miles Labs. Inc. v. Shandon Inc.*, 997 F.2d 870, 878, 27 USPQ2d 1123, 1129 (Fed. Cir. 1993), cert. denied, 127 L. Ed. 232 (1994).

(Emphasis added).

This portion of the MPEP directly relates to the last of the four factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), which are as follows:

- (A) determining the scope and content of the prior art;
- (B) ascertaining the differences between the claimed invention and the prior art;
- (C) resolving the level of ordinary skill in the art; and
- (D) considering any objective indicia of nonobviousness.

(Emphasis added). The Examiner bears the initial burden of establishing a prima facie case of obviousness, which begins with first resolving the factual inquiries of *Graham v. John Deere Co.*, 383 U.S. 1 (1966). See MPEP 2141. "If the examiner determines there is factual support for rejecting the claimed invention under 35 U.S.C. 103, the examiner must then consider any evidence supporting the patentability of the claimed invention, such as any evidence in the specification or any other evidence submitted by the applicant. The ultimate determination of patentability is based on the entire record, by a preponderance of evidence, with due consideration to the persuasiveness of any arguments and any secondary evidence." See MPEP 2142 (citing *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992) (emphasis added)). Once the *Graham* factual inquiries are resolved, the Examiner must determine whether the claimed invention would have been obvious to one of ordinary skill in the art.

Given the Examiner's incorrect assumptions regarding the standards under 35 U.S.C. § 103, as refined by *Graham*, Appellants believe that normal discretion was

exceeded in dismissing Appellants' objective evidence without due consideration, thereby creating an improper rejection over the references. For example, page 21 of the Examiner's Answer states that: "[w]ithout fully understanding the whole picture of the academic and industrial environment around the years 2001~2003, the Examiner is not in a position to explain or comment on the statistics presented by the Appellant. However, the Examiner is not convinced by the statistics that there is no reason to combine the references, or the claimed invention is not obvious in view of the combination." Similarly, in a Response Amendment submitted October 16, 2008, Appellants referred to portions of the Specification which discussed that the state of the art taught away from Appellants' invention (See Response Amendment p. 11; see also, Specification p. 1-2 (Background of the Invention)). However, in the final Office Action the Examiner dismissed such information stating, "the Examiner recognizes that a statement or an argument by the attorney is not factual evidence," citing to MPEP 716.01. (See final Office Action p. 6).

The Examiner's Answer continues to refuse to even consider such information, stating that "[a]s explained above, the Appellant's ignorance of the references...cannot be accepted as an evidence for proving that the combination of the Atia et al., Clausen et al. and Fukuchi fails to teach the claimed invention and renders the invention obvious." (See Examiner's Answer p. 22).

Given the foregoing, Appellants respectfully submit that the Examiner has failed to perform the necessary factual balancing according *Graham* and 35 U.S.C. § 103. For at least these reasons, Appellants respectfully submit that the rejection over Atia, Clausen and Fukuchi (and/or Doran) is improper under 35 U.S.C. § 103.

POINT II – Although Differences Between the Cited Art and the Claimed Embodiments Must be Determined, the Rejection Still Fails to Consider Appellants' Claims As a Whole

In the Appeal Brief, Appellants argued that in focusing upon the structural differences between claimed embodiments and the cited references, the Examiner failed to consider Appellants' invention "as a whole." See MPEP 2142.02. In the Examiner's Answer, the Examiner responds that "in a patentability investigation, the difference

between the subject matter sought to be patented and the prior art should be considered.” (See Examiner’s Answer p. 9).

Appellants well understand that the differences between the references and the claimed embodiments should be considered. However, this does not end the inquiry, because the proper question under 35 U.S.C. § 103 “is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious.” See MPEP 2141.02 (citing *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983); *Schenck v. Nortron Corp.*, 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983)). MPEP 2141.02 further notes that in *Schenck*:

claims were directed to a vibratory testing machine (a hard-bearing wheel balancer) comprising a holding structure, a base structure, and a supporting means which form “a single integral and gaplessly continuous piece.” Nortron argued the invention is just making integral what had been made in four bolted pieces, improperly limiting the focus to a structural difference from the prior art and failing to consider the invention as a whole. The prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” 713 F.2d at 785, 218 USPQ at 700 (citations omitted).

(Emphasis added).

As stated by Appellants in the Appeal Brief (see p. 16-17), Appellants’ goal was not simply to expand the use of return-to-zero phase shift keying (RZ-PSK) or RZ-DPSK from a single channel implementation to a WDM system. Rather, Appellants’ sought to develop an improved multi-channel high bit rate (e.g., 40 Gbit/s) long-haul/ultra long-haul optical transmission system, and were not confined to considering only RZ-PSK data encoding schemes. (See Specification p. 1-2, Background of the Invention). Prior to Appellants’ innovation, efforts were hampered by intra-channel non-linear penalties, such as intra-channel cross phase modulation (XPM) among adjacent overlapping bits that mostly leads to timing jitter, as well as by intra-channel four wave mixing (FWM) that mostly leads to amplitude fluctuations. Use of high bit rates in conjunction with long haul and ultra-long haul (ULH) transmission, particularly in the environment in which multiple channels are combined in a WDM or dense WDM (DWDM) system, was

additionally difficult, due to both worsened nonlinear impairments and increased amplifier spontaneous emission (ASE) noise, which leads to degradation of pulses as they propagate through an optical fiber path from a transmitter to a receiver. (See, e.g., Specification p. 1, 3rd paragraph).

Appellants overcome these deficiencies in prior long-haul high-bit rate WDM systems through the novel use of RZ (as opposed to non-return-to-zero (NRZ)) and PSK (in contrast to intensity modulation, such as on-off keying (OOK)). Advantageously, by virtue of the use of RZ-PSK formats, the XPM penalty is mostly eliminated by removing the intensity-pattern dependence. Compared with OOK, differential phase shift keying (DPSK) for example is more tolerant to ASE noise because of its higher receiver sensitivity, especially when a balanced receiver is used, and allows for transmission with lower optical power. This also reduces the FWM penalty, for example, a 3dB reduction in power leads to 6dB reduction in the FWM effects. (See Specification p. 2-3, Summary of the Invention 5th paragraph).

Moreover, all of this was contrary to known teachings and the state of the art at the time of the invention, which actually *discouraged* and *taught away* from Appellants' invention. For example, as explained in Appellants' Specification and as repeated in Appellants' Appeal Brief:

The advantageous use of PSK or DPSK encoding in the present invention is contrary to conventional approaches currently available to persons skilled in the art. For example, an early study [see J. P. Gordon and L. F. Mollenauer, Optics Letters, Vol. 15, p. 1351, (1990)] about phase noise caused by ASE and SPM in a single channel PSK system placed severe restrictions on PSK in a LH and ULH optical transmission system, and discouraged application of this coding method as a viable alternative. Further theoretical study and numerical simulation for conventional solitons showed excessive phase noise at long transmission distances and the need for "in-line" filters to control phase noise [see M. Hanna, et al., Optics Letters, Vol. 24, p732, (1999)]. In a recent experimental investigation [see M. Hanna et al., Electronics Letter, Vol. 37, p644, (2001)], conventional DPSK solitons achieved an error-free transmission distance of ~ 1000 km, significantly less than OOK soliton systems. However, in view of the present need for long reach and high bit rate WDM systems, we have recognized, for the first time, the value and feasibility of RZ-DPSK for long reach high bit rate WDM systems. Although DPSK has been proposed before for WDM systems [see M.

Rohde, et al., Electronics Letters, Vol. 36, 1483-1484 (2000)], the desire to have constant intensity in every WDM channel in order to reduce nonlinear penalties has inevitably lead to NRZ-DPSK, rather than RZ-DPSK. It was not until recently did we realize that constant intensity is not necessary and that RZ-DPSK has significant advantages over NRZ-DPSK in LH and ULH transmission, such as reduced nonlinear penalties, higher tolerance to first-order PMD, and smaller inter-symbol interference.

(See Specification p. 9 (emphasis added); cited articles were disclosed in an IDS and are available in PAIR). In view of such teachings, Appellants submit that one of ordinary skill in the art at the time of the invention would have been discouraged from creating the embodiments of Appellants' independent claims 1 and 16.

Appellants respectfully maintain that the Examiner's analysis continues to overlook Appellants' innovation by merely combining allegedly known components in hindsight without due regard to the abovementioned challenges which Appellants faced and overcame. Instead, the Examiner asks the wrong questions. For example: "The question the Examiner asks himself was whether an engineer of ordinary skill in the art, knowing the RZ-DPSK format of transmission over optical fiber, would have seen a benefit of using the same format in a WDM system. Since a WDM system is simply sharing a single fiber by a plurality of wavelength channels where each channel is somewhat independent of the other channels, the answer is affirmative." (See Examiner's Answer p. 10). In another instance, the Examiner's Answer states that:

the Examiner is analyzing the difference between Atia and the claimed invention and forming an opinion as to whether the claimed invention as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. This has been done by first resolving the knowledge of one of ordinary skill in the art based on the teaching of using short pulses by Clausen and the teaching of WDM technique by Fukuchi; and then by answering the question "would one of ordinary skill in the art modify the system of Atia by using short pulses and by combining many transmission channels with different wavelengths in a WDM system[?]" The affirmative answer to this question has led the Examiner to draw the conclusion that the claimed invention is obvious and not patentable in view of the references.

(See Examiner's Answer, p. 18).

As stated in *Schenck v. Nortron Corp.*: “The prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. ‘Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.’” 713 F.2d at 785, 218 USPQ at 700. Similarly, in this case using return-to-zero phase-shift keying pulses (or DPSK or QPSK) in a wavelength-division multiplexed system was contrary to the known teachings and was in fact discouraged by the state of the art. Nothing in the combined teaching of Atia, Clausen, Fukuchi and/or Doran contradicts such facts. Given the foregoing, the Examiner’s starting point, “whether an engineer of ordinary skill in the art, knowing the RZ-DPSK format of transmission over optical fiber, would have seen a benefit of using the same format in a WDM system,” is one that can only be reached in hindsight by deconstructing Appellants’ claims into their allegedly known components. Such an analysis improperly assumes that one of ordinary skill in the art would have been ignorant of the state of the art which *discouraged* and *taught away* from Appellants’ innovations.

Notwithstanding the above, it should also be noted that the Examiner’s Answer acknowledges that “the Examiner is not suggesting that one of ordinary skill in the art, after reading the three references and without knowing the claimed invention, would have chosen to build a system as claimed in claim 1 or 16.” (See Examiner’s Answer p. 18). However, this is exactly what *is required* in order to render Appellants’ claims obvious; that one of ordinary skill in the art, having considered the three references, would have been motivated to implement a system in accordance with the embodiments of Appellants’ claims. This has not been demonstrated. Accordingly, for at least these reasons, Appellants respectfully submit that the claimed embodiments are not obvious over the references.

POINT III – The Examiner’s Assertion that Claimed Embodiments were “Obvious to Try” is not Supported by the State of the Art at the Time of the Invention or the Alleged Combination of References Themselves

It appears that the Examiner's Answer newly asserts that the obviousness rejections could be based upon a conclusion that the claimed embodiments are "obvious to try." (See Examiner's Answer p. 10). While not explicitly stated in the office actions, Appellants note that the final Office Action argues, "Fukuchi provides strong evidence that at the time of the invention, it is obvious to combine optical carriers at different wavelengths using wavelength division multiplexing technique. Since Fukuchi has demonstrated that it can be done, it is reasonable for the Examiner to expect that one of ordinary skill in the art can combine the teachings of Atia et al., Clausen et al. and Fukuchi successfully without reasonable amount of experiments." (See Final Office Action p. 6) (emphasis added). This appears at least to be an argument that is indicative of the Examiner's "obvious to try" rationale. Notwithstanding, Appellants respectfully disagree.

In particular, the fact that one of ordinary skill in the art is *capable of* something or *could* do something does not mean that he or she actually *would* do so, given the state of the art at that time. As stated above, Appellants respectfully submit that the Examiner's starting point for analysis under 35 U.S.C. § 103 is incorrect. Specifically, the Examiner first asserts that wavelength division multiplexing is well known. Then "the Examiner asks himself was whether an engineer of ordinary skill in the art, knowing the RZ-DPSK format of transmission over optical fiber [allegedly taught in Atia], would have seen a benefit of using the same format in a WDM system [as allegedly taught in Fukuchi]." (See Examiner's Answer p. 9-10). According to the Examiner, "[s]ince a WDM system is simply sharing a single fiber by a plurality of wavelength channels where each channel is somewhat independent of the other channels, the answer is affirmative." (See *id.* at p. 10). Further, the Examiner appears to argue that working out the differences between the references, in order to have the teachings work together as a functioning system identical to Applicants' claimed embodiments, are simple "performance issues" such as crosstalk, non-linearity, signal degradation, data rate and bit-error rate. (See *id.*).

However, the alleged simplicity noted by the Examiner is contradicted by facts and circumstances noted by Appellants above. For example, the fact that Appellants' invention was contrary to the understandings and expectations of the art indicates that

one of ordinary skill in the art at the time of the invention would *not* have created a system in accordance with Appellants' claims. This conclusion is further supported by the fact that no prior studies disclosed the advantages, desirability or even the testing of WDM RZ-DPSK (and RZ-PSK and RZ-QPSK). Stated differently, if one accepts that it was obvious to try to extend the use of RZ-DPSK from Atia's single channel implementation to a WDM system, as alleged in the Examiner's Answer, it should then also be surprising that no single prior art reference teaches the same claimed embodiments.

Moreover, an explosion in literature describing experiments with respect to WDM RZ-DPSK (as well as WDM RZ-PSK and WDM RZ-QPSK) only occurred *after* (and as a consequence of) Appellants' disclosure to the most relevant research and academic community in 2002. (See Declaration under 37 C.F.R. 132, executed by the inventors on September 13, 2007 and submitted September 17, 2007, which demonstrates the contrast in the number of reported activities of RZ-DPSK in fiber transmission, before and after the report of experimental results of the present invention at the 2002 Optical Fiber Conference (OFC 2002, FC2, p. 2 Exhibit A), one of the most well-attended conferences in optical communications technology). Given the foregoing, Appellants respectfully submit that the claimed embodiments were not "obvious to try" given the state of the art at the time of the invention.

In addition to the above, Appellants respectfully submit that the claimed embodiments were not obvious to try, even when viewing the cited references alone (i.e., without reference to other literature in the field). Specifically, as stated in the Appeal Brief, a prior art reference must be considered in its entirety, including portions that would lead away from the claimed invention. (See MPEP 2141.02 (VI)).

Atia and Clausen are single wavelength channel applications and do not discuss or suggest WDM. Atia teaches that the use of both on-off keying (OOK) (an intensity modulation format) and differential phase shift keying (DPSK) with return-to-zero (RZ) pulses are advantageous in improving the sensitivity of a receiver. (See Atia p. 226, last paragraph). Clausen teaches intensity modulated signals (e.g., OOK). (See Clausen col. 1 lines 51-54). Moreover, Fukuchi teaches non-return to zero (NRZ) intensity modulated signals. (See Fukuchi, Abstract and col. 1 lines 21-23). Given that two of the three

references (Clausen, Fukuchi) only teach the use of OOK intensity modulation and that the other reference (Atia) teaches both OOK and DPSK, the center of gravity would lead to the preference for OOK (whether due to the apparent advantages of OOK disclosed in the references, or the fact that it would require less modifications to have the references work together in a coherent, functioning system). In other words, when considering the entirety of each of the references, the use of RZ-PSK formats (e.g., RZ-PSK, RZ-DPSK, RZ-QPSK) in a WDM system is not reasonably suggested.

Thus, for all of the above reasons, Appellants respectfully submit that the claimed embodiments are not obvious or “obvious to try” under 35 U.S.C. § 103, whether in view of the state of the art at the time of the invention and/or in view of the cited references.

POINT IV – The Examiner’s Answer Fails to Establish an Express Motivation to Combine the References in the Manner Alleged

Appellants argued in the Appeal Brief that there is no express motivation to combine the reference that can be found in the references themselves. (See Appeal Brief p. 18). In response, the Examiner’s Answer points out that “amplitude modulation is not completely contrary to RZ-DPSK” since DPSK encoding can be achieved by carving out optical pulses by amplitude modulating the laser beam from a DFB laser and then modulating by phase modulation. (See Examiner’s Answer p. 15). Respectfully, even if true, this does not contradict that there is no express motivation to be found in any of the references themselves to combine two or more with each other in order to arrive at the embodiments of Appellants’ claims. Accordingly, Appellants respectfully submit that the Examiner has failed to establish any express motivation to combine the references.

POINT V - Newly Cited References do not Affect the Patentability of the Claimed Embodiments

The Examiner’s Answer at p. 19 cites three new references which are alleged to teach the use of return-to-zero pulses in a wavelength division multiplexed system (RZ-WDM) and which are alleged to contradict Appellants’ citation of “certain references as

evidence of non-obviousness.” (See Examiner’s Answer p. 19). However, as noted in the Examiner’s Answer, these publications were not publicly available to Appellants at the time the application was filed. As such, Appellants submit that such references are not representative of the state of knowledge in the art.

Moreover, even if the Board were to consider the teachings of the newly cited references, none of the three discloses or even suggests the use of RZ phase shift keying type data modulation (e.g., PSK, DPSK, QPSK) in a WDM system. Thus, the Examiner still fails to demonstrate that the references, alone or in any permissible combination, teach all of the claimed limitations.

In fact, Robinson, et al. (U.S. Patent No. 6,643,429) never explicitly discloses return-to-zero pulses in a WDM system. Rather, return-to-zero pulses and wavelength division multiplexing are separately discussed.

Further, Lu, et al. (U.S. Patent No. 6,832,051, hereinafter “Lu”), which mentions the use of return-to-zero in WDM, describe major system impairments such as self-phase modulation (SPM), inter-symbol interference (ISI), cross-phase modulation (XPM) and four wave mixing (FWM). According to Lu: “In known WDM systems, dispersion managed links that minimize SPM tend to maximize XPM, and vice versa. Without addressing the trade-off between SPM, ISI, and XPM effects, the overall performance of WDM systems can be penalized.” (See Lu, col. 1 lines 53-62). Lu overcomes these issues by selecting dispersion compensating fibers and dispersion compensating modules that minimize the maximum combined effect, occurring at a WDM wavelength, of SPM, ISI and XPM. (See Lu, col. 2 lines 1-4).

In sharp contrast, Appellants overcome these deficiencies in prior long-haul high-bit rate WDM systems through the novel use of RZ (as opposed to non-return-to-zero (NRZ)) and PSK (in contrast to intensity modulation, such as on-off keying (OOK)). Advantageously, by virtue of the use of RZ-PSK formats, the XPM penalty is mostly eliminated by removing the intensity-pattern dependence. Compared with OOK, differential phase shift keying (DPSK) for example is more tolerant to ASE noise because of its higher receiver sensitivity, especially when a balanced receiver is used, and allows for transmission with lower optical power. This also reduces the FWM penalty, for example, a 3dB reduction in power leads to 6dB reduction in the FWM effects. (See

Specification p. 2-3, Summary of the Invention 5th paragraph; see also p. 6 of this Reply Brief, which discusses such features in greater detail).

Finally, while the Examiner's Answer cites Bai et al. (U.S. Patent No. 6,856,770, hereinafter "Bai") as teaching the advantages of using RZ over NRZ in a WDM system, the cited portions of the reference are completely silent with respect to the apparent superiority. (See, e.g., Bai col. 1 lines 1-17). Rather, at best, Bai teaches that the user of return-to-zero (RZ) overcomes the non-linear distortion problem because in RZ, the distortion caused by SPM is pattern-independent. (See Bai, col. 2 lines 9-17). However, this falls far short of disclosing the use of RZ phase shift keying type data modulation (e.g., PSK, DPSK, QPSK) in a WDM system, as taught and claimed by Appellants.

Accordingly, Appellants respectfully submit that the newly cited references do not affect the patentability of the claimed embodiments, even if such references were properly cited prior art.

POINT VI – Additional Remarks

It should also be noted that the Examiner further argues that certain features that are mentioned in Appellants' Appeal Brief (e.g., long-haul transmission) are not recited in the rejected claims. However, Appellants' claims *are* in fact directed to long haul transmission. For example, the preambles of claims 1 and 16 respectively recite, "Apparatus adapted for use in long haul transmission in an optical communication system..." and "A method of transmission for long haul optical communications..." Appellants recognize that whether a preamble is given patentable weight is determined on a case-by-case basis. See, e.g., MPEP 2111.02. However, the Board does not need to resolve this issue since independent claims 1 and 16 respectively include the limitations of "a dispersion managed optical transmission medium for transmitting an output wavelength division multiplexed signal of said wavelength division multiplexer" and "transmitting said wavelength division multiplexed signal in a dispersion managed optical transmission medium." Appellants respectfully submit that dispersion management would only be applied in a transmission system that is long-haul or ultra-long haul because dispersion is usually not a limiting factor in shorter transmission

distances. Thus, such features should be taken into consideration by the Examiner and the Board when evaluating Appellants' claims.

In addition, at page 20 of the Examiner's Answer it is alleged that Appellants have admitted that "the combination of Atia, Clausen and Fukuchi renders the using of RZ-DPSK in a WDM system obvious at least for transmission system with transmission distance of less than 1000 km." (See Examiner's Answer p. 20). Appellants respectfully disagree.

Although Appellants' claims are directed to long haul or greater transmission, in light of the problems addressed by Appellants and the proposed solutions, Appellants do not make any representations with respect to non-long-haul systems and expressly do not admit that such a system is obvious over the alleged combination of Atia, Clausen and Fukuchi (and/or Doran). Notably, the Examiner fails to demonstrate a single prior art reference which teaches the use of RZ-DPSK, RZ-PSK or RZ-QPSK in *any* WDM transmission system. Moreover, whether the transmission distance is more or less than approximately 1000 km, there is no proper rationale under 35 U.S.C. § 103 to combine the alleged references in the manner asserted by the Examiner.

CONCLUSION

Thus, Appellants submit that all of the claims presently in the application are allowable.

For the reasons advanced above, Appellants respectfully urge that the rejection of claims 1, 10-13, 15, 16 and 21-28 is improper. Reversal of the rejection of the Final Office Action is respectfully requested.

Respectfully submitted,

Dated: 10/7/09

A handwritten signature in dark ink, appearing to read "Michael Bentley", is written over a horizontal line.

Michael Bentley
Registration No. 52,613
Wall & Tong, L.L.P.
595 Shrewsbury Ave. Suite 100
Shrewsbury, NJ 07702
Telephone: (732) 842-8110 X120
Facsimile: (732) 842-8388
Attorney for Appellant(s)